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THE STEADY WARMTH OF THE TROPICS

By MARK JEFFERSON [*]

The steadiness of the warmth in tropical regions is difficult to realize without actual experience of it, especially for points near the coasts. *Torrid* zone is as much a misnomer as *temperate* zone. It is not hot for the most part. New York, Chicago and Detroit all have greater heat on occasional summer days than points close to the equator, but down there it *stays* warm. Even the nights cool off but little.

The only way to get some idea of this, short of an actual voyage, is from such records as the two here shown. They are from Ancón, in the Panama Canal Zone, and Detroit, Michigan. They consist of the observed maximum and minimum temperatures for every day from Oct. 1, 1912, to Oct. 31, 1913, for both places. Ancón is on the south side of the isthmus, near the Pacific end of the canal, and is sheltered from the trade winds by the isthmus. It is nine degrees north of the equator.

Both places happened in that year to have the same maximum temperature of 96°, Ancón on the 27th of April, Detroit on the 15th of June. However, Detroit has seen the thermometer at 101°, four degrees warmer than Ancón's maximum (in eight years) of 97°. It has been hotter, that is, in Detroit than at Panama, which is also true of a vast number of places in the temperate zone. At Yuma, Arizona, the thermometer has been up to 119°. That is nearly thirty-three degrees north of the equator. This temperature can probably be matched at many other points, all in the temperate zone, in southwest Australia, in Arabia and northwestern India. As far as I can learn, the torrid zone knows no such heat.

To return to Detroit, this record shows it to be hotter than Ancón on fifteen occasions in June, July, and August of 1913, though the nights were almost always cooler than in the tropics. It is certainly *warm* in the tropics, but the characteristic feature which this diagram brings out excellently is not so much the great intensity of the heat as its astonishing steadiness. This is usually shown by quoting the monthly mean temperatures, as given in the two curves of

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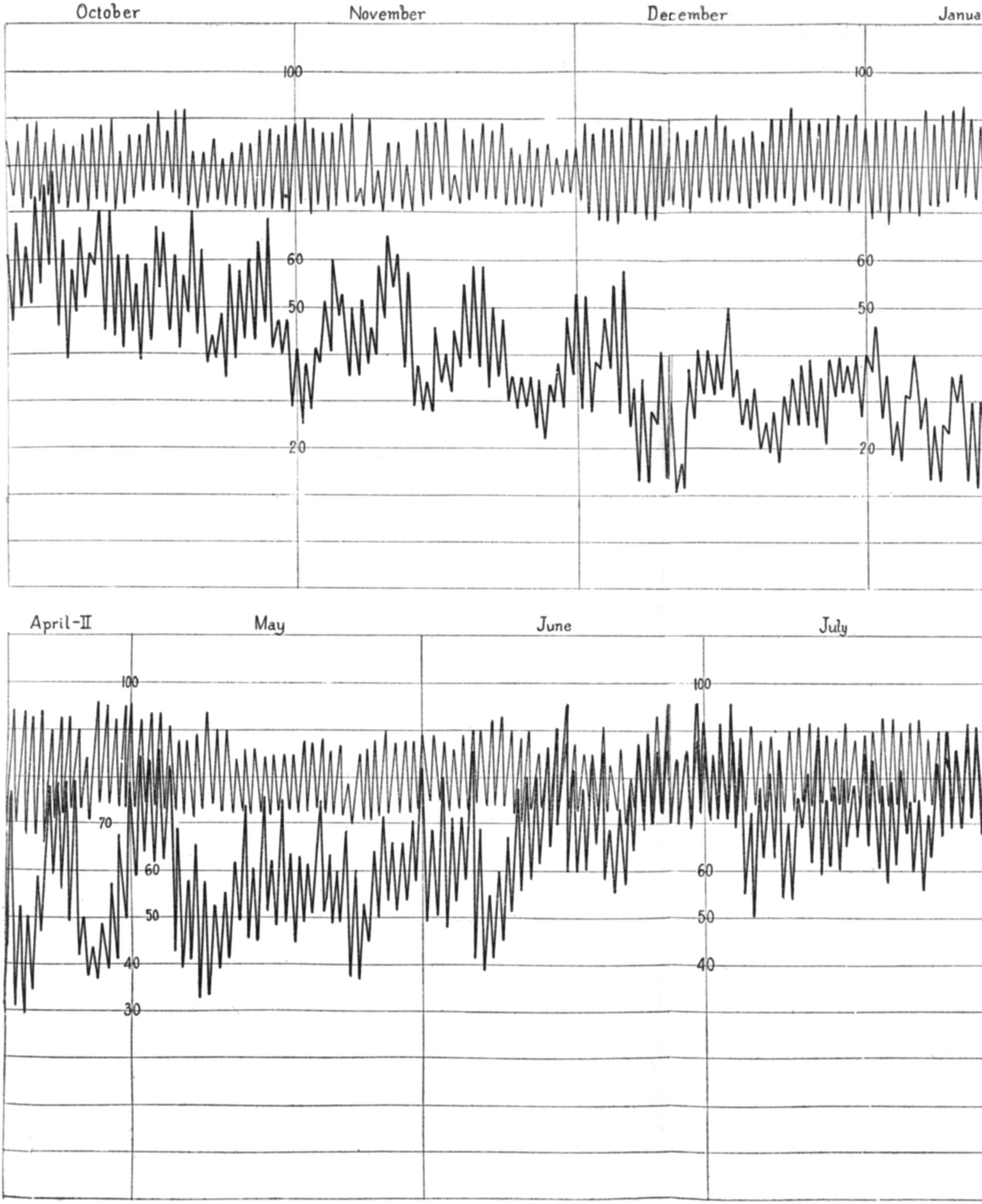
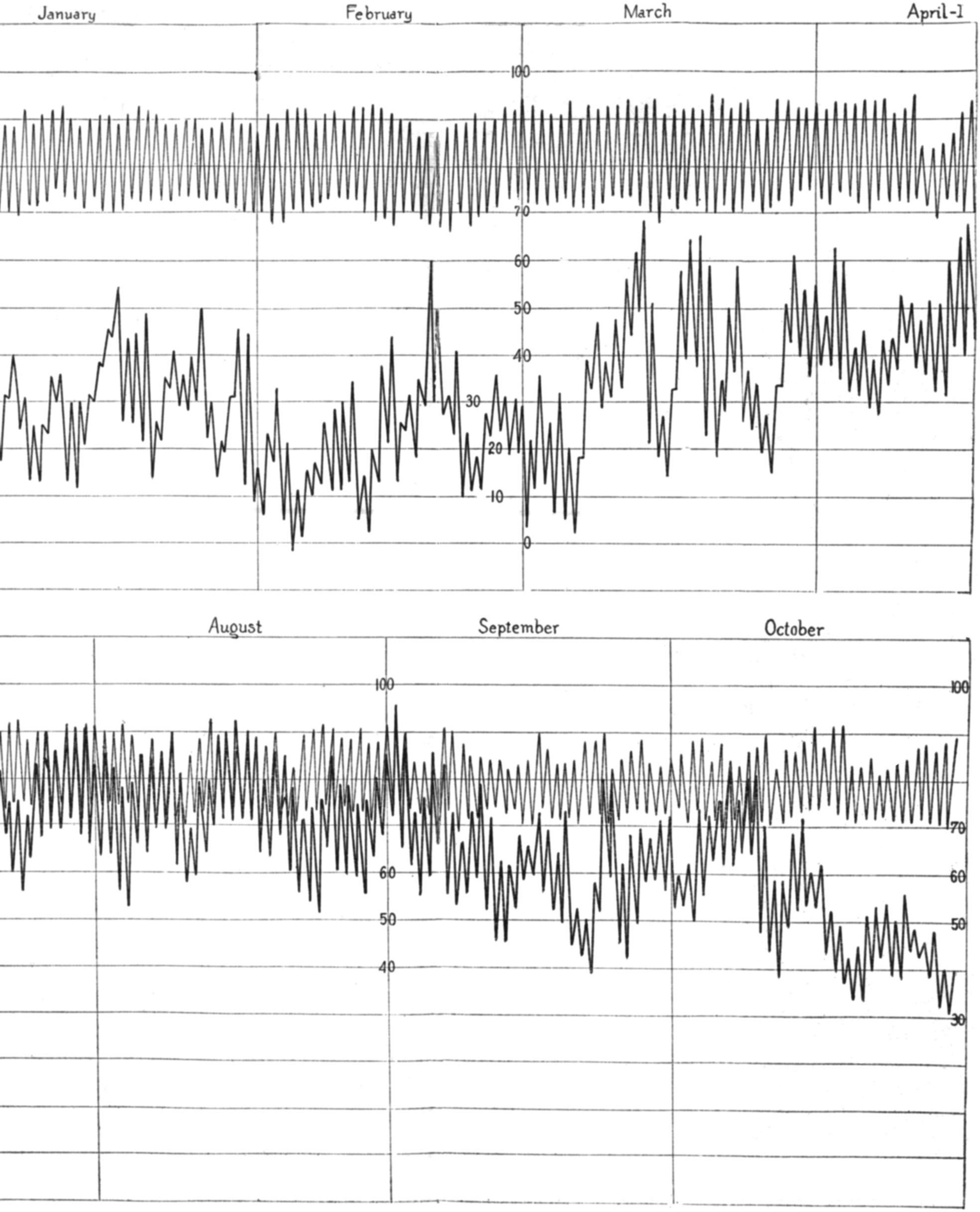


FIG. 1—Daily oscillations, for the period October 1, 1912, to October 31, 1913, of the actual temperature at Detroit, Mich. (heavier cur



(heavier curve) and Ancón, Panama Canal Zone. Ancón is near the Pacific end of the Canal, nine degrees north of the equator.

Figure 2, for the same year, with 50° difference between summer and winter for Detroit and no seasons perceptible at Ancón. The sun is overhead at Ancón about mid-April and the end of August.

But averages are unreal things to study. The merit of Figure 1 is that the actual facts of each day are there given. *Ancón is always warm,* is the first conclusion I draw from it. The temperature there rose to 90° in the day time in every month of 1913, and only twenty-four times in the year did it fall below 70° at night. Almost every day there is a temperature change of from 15° to 20°.

The saying that night is the winter of the tropics is also illustrated by the curve. Night is without exception colder than day, which is by no means to be said of our winter temperatures in the temperate zone. The 3rd, 4th, 7th and 8th of January at Detroit, for instance, had noonday cooler than the previous night. The only seasons in the tropics are the dry and rainy ones.

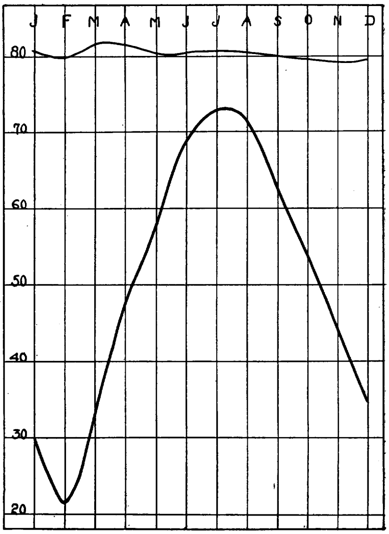


FIG. 2—Annual temperature curves for Detroit, Mich., and Ancón in the Panama Canal Zone.

It will be noticed, however, that the heat of day is five or six degrees less from May to October, inclusive, dropping from 91° or 92° in November, December, January, February and March to 86° or 87° in the rest of the year. This is the season of rains. From May to October every month but July has over eight inches of rain, while January, February, March and April have less than an inch each. As the rains imply clouds the heat of the sun is lessened in the rainy season. Fogs, too, are then very prevalent. The nights, moreover, are one or two degrees warmer in the rainy season, radiation from the ground being doubtless prevented or, rather, hindered by the clouds. But thanks to a high humidity at this time this may well be the most uncomfortable time of the year.

The second thing to be learned from the curves is that the characteristic of the temperature of our *temperate* zone is our "spells" of weather. This is quite as pronounced in its way as the greater difference from summer to winter, and throughout the winter it is more distinct than the differences of day and night. March is a good example, with its four warm spells and four cold spells. From 3°, March 6th, the temperature rose 67° on the 13th, to drop again to 15° on the 15th of the month. Such a warm spell was the "January thaw" of the middle of that month. As usual there were several of them. On the right of the diagram, October has "Indian summer" in its initial warm spell, following the cold spells of late September. Other cold spells appear as the "early frosts" of November and the "late frosts" of May.

It is impossible to run the eye along the graph for Ancón without being impressed by the fact that the warmth of the tropics is amazingly steady.

NORTHERN PATAGONIA[1]

A RESUMÉ OF MR. BAILEY WILLIS'S SURVEYS ALONG THE FORTY-FIRST PARALLEL

By **ISAIAH BOWMAN**
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INTRODUCTION

The versatile and brilliant quality of Mr. Willis's work has nowhere else been shown to such good advantage as in the series of books and reports on Patagonia that have come from his pen during the past two years. A condensed account of his first season's work was published in the *Geographical Journal* (London), Vol. 40, 1912, pp. 607-615: "Recent Surveys in Northern Patagonia."[2] The latest contribution is a striking book entitled "Northern Patagonia," published in an English and a separate Spanish edition by authority of the Ministry of Public Works of the Argentine Republic and accompanied by a set of thirteen maps showing geologic, topographic and forestry conditions and a tentative land classification of the Andes of Northern Patagonia. For the present this volume closes the series of reports, as the

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[1] Northern Patagonia. Character and Resources. Vol. 1: A study of the elements of development in the region tributary to the national railway from Port San Antonio to Lago Nahuel Huapí and the extension to Valdivia, Chile, including the Andean lake district. Text and maps by the Comisión de Estudios Hidrológicos. Bailey Willis, Director, 1911-14. 464 pp. Maps, ills., index and maps in separate case. Ministry of Public Works, Argentine Republic. Charles Scribner's Sons, New York, 1914. $6, postage extra. Maps in separate case, $2. 10 x 7.

[2] An abstract of this paper (with a map) was published in the *Bulletin* (Vol. 45, 1913, pp. 357-359. Since then he has published a closely organized and illuminating account of the geographic problems of Argentina under the title, "The Physical Basis of the Argentine Nation" (Latin America; Clark University Addresses, November, 1913; edited by G. H. Blakeslee, 1914; pp. 342-359). In addition there have been published "The Forty-First Parallel Survey of Argentina" and "Physiography of the Cordillera de los Andes between Latitudes 39° and 44° South" in the *Compte Rendu* of the Twelfth International Geological Congress of 1913 (published in 1914). pp. 713-731 and 733-756. respectively.